ORIGINAL ARTICLE

Dental Diseases in Diabetes

WASIM AMIR, SARAH SHOAIB QURESHI, SOHAIL NASIR, *HUMA SHAKIR, GULSENA MASUD KHAN*

ABSTRACT

Aim: To study periodontal disease in diabetes mellitus (DM) patients which is often a neglected complication.

Methods: One hundred diabetic patients were included in the study. They were asked 6 questions each about dental health including bleeding gums, loose or missing teeth, pain and bad breath.

Results: The age ranged from 18 to 85 years. 77 had dental disease while 23 had no dental symptom. 12,34,15 and 15 patients had 1, 2 3 and 4 symptoms respectively while 1 patient had all 6 symptoms. Out of 23 patients who had no symptoms 11(47.8%) were controlled and in symptomatic group 65(84.4%) patients had uncontrolled diabetes, p value 0.06. In addition, out of asymptomatic patients 19(82%) had diabetes of less than 5 yr duration, whereas in symptomatic patients 19(25%) had diabetes of more than 10 yrs duration, p-value 0.03.

Conclusion: Dental diseases are an important complication of uncontrolled diabetes and increase with the duration of disease.

Keywords: Diabetes mellitus, dental

INTRODUCTION

Epidemiological studies have shown diabetes (both type 1 and 2) to be a major risk factor for periodentitis and periodental disease. When diabetes is poorly controlled, or when other diabetic complications are present, patients are more likely to have periodontal disease as well[1]. Periodontal disease is associated with an elevated systemic inflammatory state which adversely affects glycaemic control in people with diabetes. Therefore control of these two dental problems can improve the control of diabetes as well.

On the other hand there is now emerging evidence which links presence of periodontal disease to development of CVD and diabetes mellitus. These facts have been mainly published in dental journals. This association is not commonly appreciated by physicians, diabetologists and cardiologists and even patients are not aware of this problem.

Periodontal disease is one of the most consistent finding in uncontrolled diabetics. Approximately 75% of uncontrolled diabetics have periodontal disease with increased alveolar bone resorption and inflammatory gingival changes. Even diabetics with good control are also found to have a higher incidence and greater severity of periodontal disease than normal population. Poorly controlled diabetics present with increased gum bleeding, swollen gums, increased probing depths, increased attachment loss, greater number of missing teeth, increased alveolar bone loss and tendency towards abscess formation[2]. Periodontal disease is more frequent and severe in diabetic individuals having other advanced systemic complications, which does not correlate with increased levels of plaque and calculus[3].

Diabetics with periodontal infection have a greater risk of poor glycaemic control overtime compared to diabetics without periodontal disease[4]. Periodontal interventional trials have suggested a significant potential metabolic benefit of periodontal therapy in patients with diabetes[5]. The improvement of glycosyalted hemoglobin is often about 0.9 to 1% after periodontal treatment. This study was done to determine the incidence of periodontal disease in diabetics in relation to the duration and control of diabetes.

PATIENTS AND METHODS

This study was conducted at diabetic clinic Ghurki trust teaching hospital. 100 consecutive diabetic patients were included. The inclusion criteria included:

1. Known diabetics already taking oral hypoglycemics or insulin
2. Recently diagnosed diabetics (during last one month on the basis of 2 raised blood sugar levels or high HbA_1C levels)
3. Diabetes control was assessed by HbA_1C above 7% within last 3 months or 3 consecutive blood sugar levels above 200mg%.

After taking informed consent, history was taken and patients examined especially for neuropathy and retinopathy. Patients were also questioned about the number of years they have been diagnosed as

Department of Medicine, Lahore Medical & Dental College/Ghurki Trust Teaching Hospital, Lahore
Correspondence to Dr. Sarah Shoaib Quresi, Assistant Professor Email:sarahsqureshi@yahoo.com

diabetic. Urine examination was done to find proteinuria to document nephropathy. All the patients were asked six questions each to assess their dental health. The questions were:

1. Do your gums bleed on brushing or overnight?
2. Are any of your teeth loose?
3. Can you chew everything you want to?
4. Do you have a bad taste or smell from your mouth?
5. Do you suffer from pain, swelling, gumboils, or blisters?
6. Missing teeth?

The data was analyzed on SPSS version 17.

RESULTS

One hundred consecutive patients who presented to diabetic OPD of GTTH were included in the study. The patient's age ranged from 18 - 85 years. The age distribution is shown in the figure 1.

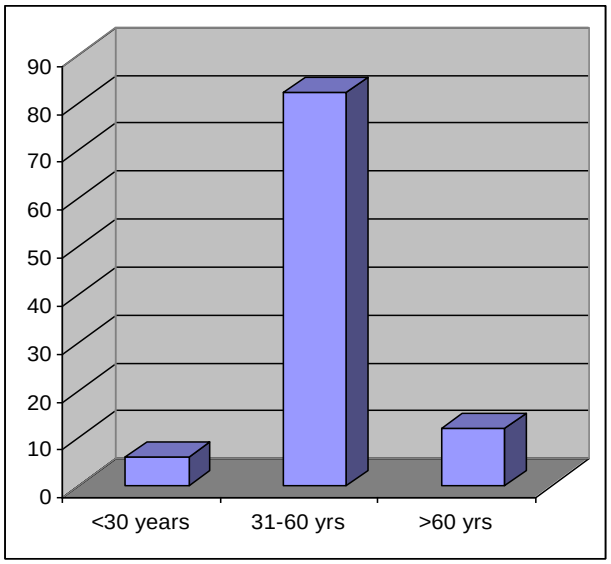


Table 1: Symptoms of dental disease

Symptom	n
Do your gums bleed on brushing or overnight?	59
Are any of your teeth loose?	49
Can you chew every thing you want to?	18
Do you have a bad taste or smell from your mouth?	28
Do you suffer from pain, swelling, gumboils, or blisters?	3
Missing teeth?	34

Twelve patients were males. Out of the 100 patients included in the study 77% had dental problems. 23 patients had no symptoms. 12, 34, 15 and 15 patients were having 1, 2, 3 and 4 symptoms respectively. 1 patient had all the six symptoms present. The most common dental problem encountered was bleeding of gums either overnight or on brushing and was present in 59 patients. 49 patients had loose teeth while 34 had missing teeth. Bad taste and smell was a problem in 28 whereas 18 had problem chewing and 3 had pain and swelling in gums (Table 1).

The patients included in the study ranged from having diabetes from recently diagnosed to 25 years. Out of 7 patients who were recently diagnosed as diabetics, 3 had dental problems. The relationship of symptoms with years since diabetes diagnosis is shown in the table 2. Out of 23 asymptomatic patients 19(82%) had diabetes of less than 5 year duration, while out of 77 symptomatic patients only 41% had diabetes of less than 5 year duration and 19(25%) had diabetes of more than 10 year duration. Therefore, it can be seen that the dental symptoms increase with the duration of diabetes (p value 0.038477).

Table 2: Relationship of symptoms with years since diabetes diagnosis.

Symptoms	n	< 5yr	5-10 yr	11-20 yr	>20 yr
0	23	19	3	0	1
1	12	5	6	1	0
2	34	15	14	4	1
3	15	6	3	6	0
4	15	6	3	4	2
6	1	0	0	1	0

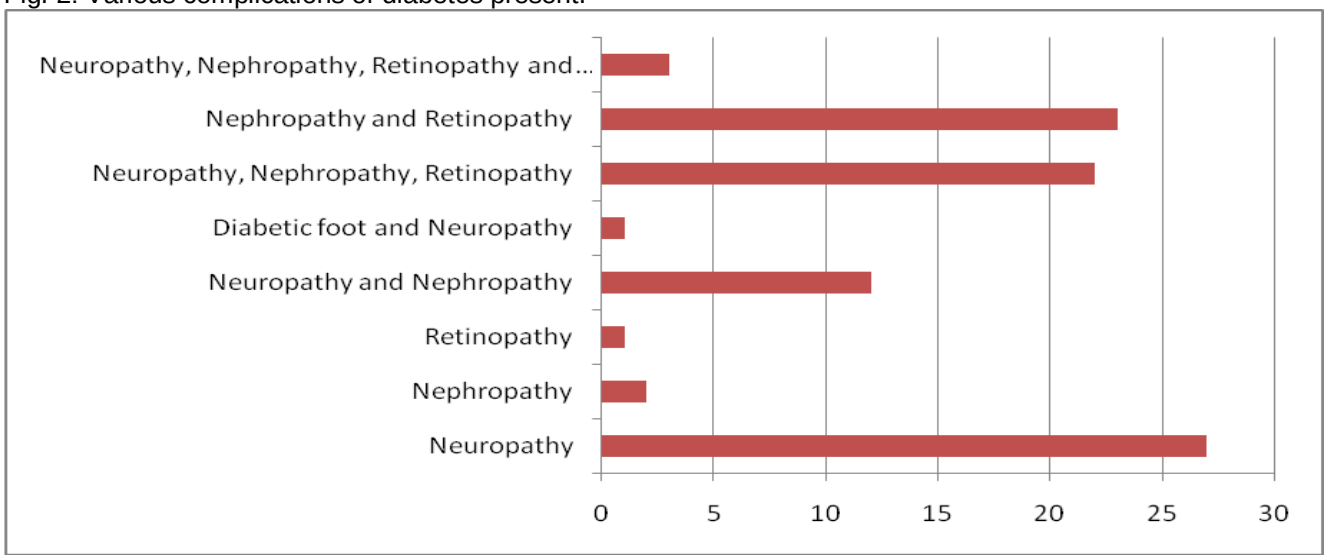
As far as diabetic control was concerned, only 23 patients out of 100 had controlled diabetes, 11(47.8%) in the asymptomatic group and only 12(15.5%) in the symptomatic group. 65(84.4%) of the 77 symptomatic patients were uncontrolled, as depicted by their HbA_1C or 3 consecutive sugar reading of above 200mg/dl in past 3 months. Relation of symptoms in both groups with control of blood sugar was clinically significant (p value 0.06447). Table 3 shows the relationship of symptoms with diabetes control.

Table 3: Symptoms & control of diabetes (n=100)

Symptoms	Controlled DM	Uncontrolled DM
0	11	12
1	4	8
2	5	29
3	2	13
4	1	14
6	0	1

91% patients included in the study were also had other complications of diabetes (Fig. 2). Out of 23 patients having no dental problems, 8 also had none of these complications, whereas only 1 patient having dental symptom had uncomplicated diabetes.

Fig. 2: Various complications of diabetes present.



DISCUSSION

There are 170 million diabetic patients worldwide. Pakistan ranks sixth in the world with approximately 6.2 million, in the 20-79 year age, affected by the diabetes[3].

Diabetes mellitus, a chronic metabolic disorder characterized by hyperglycemia due to impaired secretion or action of insulin. Hyperglycemia leads to production of advanced glycation end substances (AGEs) in the tissues, in addition to other metabolic abnormalities. These AEGs have unpredictable effects on the oral cavity and teeth[6,7]. The fibroblasts, which repair periodentum are not able to repair the damaged collagen because of binding with AGEs in high glucose environment, leading to delayed wound healing [8]. This also causes bone resorption and break down of collagen fibers, leading to weakening of periodontal support and increasing tooth mobility[9].

Hyperglycemia also causes increased susceptibility to infection in periodontal tissues resulting in build-up of oxidative stress. Diabetes in itself is a pro-inflammatory condition, with elevated levels of inflammatory cytokines and reactive oxygen species (ROS), and thus inflammation in periodontal tissues is exacerbated, which is characteristic of periodentitis[10]. Aggressive periodentitis is now recognized as the sixth major complication of poorly controlled diabetes in both type 1 & 2[12,13]. The other five complications being retinopathy, neuropathy, nephropathy, cardiovascular disease and peripheral vascular disease[14].

About 6-10% of 35-44 year old diabetic patients have been shown to have moderate form of periodontal disease in Pakistan[3]. On the contrary, present study shows that 77% of the diabetics were having some dental problems. This difference may be due to the fact that we have included all the tooth related symptoms in the study and not only periodentitis. In addition, our age distribution for patients is also broader, ranging from 18 - 85 years.

Differences in cultural, socioeconomic, dietary and oral hygiene practices in a given population also affect the burden of oral diseases, including periodontal disease [15]. This makes one set of population different from the other, even in the same country. In another population based survey conducted by Harris, on behalf of Colgate Total, about oral health reveals that more than half (54%) diabetics report one or more symptoms of gum disease[16].

In our study 12, 34, 15 and 15 patients were having 1, 2, 3 and 4 symptoms respectively. One patient had all the six symptoms present. The most common dental problem encountered was bleeding of gums either overnight or on brushing and was present in 59 patients. 49 patients had loose teeth while 34 had missing teeth. Bad taste and smell was a problem in 28 whereas 18 had problem on chewing and 3 had pain plus swelling in gums. These questions were in accordance with the British Society of Periodontolgy and are to be asked in history taking of dental diseases[17]. Gum bleeding, bad smell and taste are usually not told by the patient and has to be questioned. Difficulty in chewing may or may not be volunteered by the patient. The exact frequency of these symptoms has not been studied in most of the previously published trials.

The patients included in this study ranged from having diabetes from recently diagnosed to 25 years. Out of 7 patients who were recently diagnosed as having diabetes, 3 had dental

problems. The number of dental complications went on increasing as the number of years of diabetes increased (p value 0.038477). So there is a significant association of dental complications with duration of diabetes[18].

As far as diabetic control was concerned only 23% were controlled, and out of these only 12(15.5%) were in the symptomatic group. Whereas out of 77 patients with symptoms 65 (84.4%) were uncontrolled. The p value turned out to be 0.06477, which is significant. 91% patients included in the study were also having other major complications of diabetes in addition to dental complications. Out of 23 patients having no dental problems 8 had no complications whereas 1 patient in the dental problems group had uncomplicated diabetes. This is in accordance to the data elsewhere, that the dental complications start appearing along with other major diabetic complications, and more the patients have complicated diabetes, higher are their chances of having dental complications[18]. Though, dental complications do not have a specific relation to other complications.

CONCLUSION

Dental problems are important but underestimated complications of diabetes increasing with the duration and control of diabetes. They should be properly looked for and treated to get a better control of diabetes. Further studies are required in association with dentists and proper examination to know exact types and frequency of diabetes. Also control of diabetes with treatment of periodental disease should be assessed.

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